Journal of Criminal Law and Criminology

Volume 106 | Issue 4 Article 3

Fall 2016

Police Body Cameras in Large Police Departments

Barak Ariel

0091-4169/16/10604-0729
THE JOURNAL OF CRIMINAL LAW & CRIMINOLOGY Vol. 106, No. 4
 Printed in U.S.A.

CRIMINOLOGY

POLICE BODY CAMERAS IN LARGE POLICE DEPARTMENTS

BARAK ARIEL*

Body Worn Cameras are spreading worldwide, under the assumption that police performance, conduct, accountability, and legitimacy, in the eyes of the public, are enhanced as a result of using these devices. In addition, suspects' demeanor during police–public engagements is hypothesized to change as a result of the video-recording of the encounter. For both parties—officers and suspects—the theoretical mechanism that underpins these behavioral changes is deterrence theory, self-awareness theory, or both. Yet evidence on the efficacy of Body Worn Cameras remains largely anecdotal, with only one rigorous study, from a small force in Rialto, California, validating the hypotheses. How Body Worn Cameras affect police–public interactions in large police departments remains unknown, as does their effect on other outcomes, such as arrests. With one Denver police district serving as the treatment area and five other districts within a large metropolitan area serving as comparisons, we offer mixed findings as in the Rialto Experiment, not least in terms of effect magnitudes.

Adjusted odds-ratios suggest a significant 35% lower odds for citizens' complaints against the police use of force, but 14% greater odds for a complaint against misconduct, when Body Worn Cameras are used. No discernable effect was detected on the odds of use of force at the aggregate, compared to control conditions ($OR=0.928$; $p>0.1$). Finally, arrest rates dropped significantly, with the odds of an arrest when Body Worn Cameras not present is 18% higher than the odds under treatment conditions. The outcomes are contextualized within the framework of reactive emergency calls for service rather than proactive policing. We further discuss officers' decisions and the degree of the necessity of arrest in policing more broadly, because the burden of proof for tangible evidence necessary for making a legal arrest can be challenged with the evidence produced by Body Worn Cameras: officers become "cautious" about

arresting suspects when Body Worn Cameras are present. Limitations associated with the lack of randomly assigned comparison units are discussed, as well, with practical recommendations for future research on Body Worn Cameras.

TABLE OF CONTENTS

INTRODUCTION

Police departments have begun using Body Worn Cameras (BWCs) in daily operations all over the world, in increasing rates.[1] BWCs are

[1] *See* Uri Friedman, *Do Police Body Cameras Actually Work?*, THE ATLANTIC, Dec. 3, 2015, http://www.theatlantic.com/international/archive/2014/12/do-police-body-cameras-

hypothesized to minimize the use of force in police–public encounters, reduce citizens' complaints, and increase the accountability and the legitimacy of the police.[2] At the same time, the massive growth in implementation of BWCs is not mirrored by research on their cost-effectiveness or efficiency.[3] Currently, there is a dearth of rigorous evaluation on the efficacy of BWCs[4] with much of the published work concentrating on implementation processes,[5] officers' perceptions about the use of BWCs on policing and their professional role,[6] the extent to which officers feel micromanaged in an era of digital surveillance,[7] and legal issues associated with privacy rights in the public domain.[8] One noteworthy

---

work-ferguson/383323 (discussing the increase in federal funding for the technology).

[2] *See infra* notes 20–44 and accompanying text.

[3] *See* MICHAEL D. WHITE, POLICE OFFICER BODY-WORN CAMERAS: ASSESSING THE EVIDENCE 32–34 (OJP Diagnostic Center 2014) (speaking generally on costs and time incurred with storing camera data).

[4] *See, e.g.*, WHITE, *supra* note 3, at 29–32 (weighing costs and benefits); Barak Ariel et al., *Effect of Police Body-Worn Cameras on Use of Force and Citizens' Complaints Against the Police: A Randomized Controlled Trial*, 31 J. QUANTITATIVE CRIMINOLOGY 509, 528–31 (2015) (weighing the costs and benefits of BWCs); Justin T. Ready & Jacob T.N. Young, *The Impact of On-Officer Video Cameras on Police–Citizen Contacts: Findings from a Controlled Experiment in Mesa, Arizona*, 11 J. EXPERIMENTAL CRIMINOLOGY 445, 446 (2015).

[5] *See, e.g.*, POLICE EXECUTIVE RESEARCH FORUM, U.S. DEP'T OF JUST., IMPLEMENTING A BODY-WORN CAMERA PROGRAM [hereinafter "POLICE EXECUTIVE RESEARCH"] (2014) (giving an overview of the BWCs, issues with current usage, and recommendations for implementation moving forward); NAT'L INST. OF JUST., U.S. DEP'T OF JUST., A PRIMER ON BODY-WORN CAMERAS FOR LAW ENFORCEMENT 7–10 (2012) (reviewing implementation issues on when to use, policies and procedures, training, and data storage and management); Paul Drover & Barak Ariel, *Leading an Experiment in Police Body-Worn Video Cameras*, 25 INT'L CRIM. JUST. REV. 80 (2015) (discussing the issues in implementing BWCs).

[6] *See* Wesley G. Jennings et al., *Cops and Cameras: Officer Perceptions of the Use of Body-Worn Cameras in Law Enforcement*, 42 J. CRIM. JUST. 549, 550 (2014).

[7] *See* Neil Wain & Barak Ariel, *Tracking of Police Patrol*, 8 POLICING 274, 278, 281 (2014) ("The limited literature on the impact of tracking further raises a number of questions on how tracking technology can affect officer behaviour or police subculture. For instance, what will the impact of GPS, body-worn videos and other tracking devices be on officer's discretion? On the one hand, there have been recent voices in British policing calling for increased discretion, including providing officers with the power to implement out of court disposals. However, if 'every' decision is tracked and inspected, would it have an effect on the willingness of officers to exercise this discretion? Similarly, are officers less inclined to engage with suspects when they are aware that they are being watched? We believe that these questions are indeed normative in nature, yet before introducing policies, basic science must be applied in order to provide policymakers with the necessary evidence about the scope of these phenomena from an empirical perspective." (internal citations omitted)).

[8] David A. Harris, *Picture This: Body-Worn Video Devices (Head Cams) as Tools for Ensuring Fourth Amendment Compliance by Police*, 43 TEX. TECH. L. REV. 357 (2010). *See*

study on the effectiveness of BWCs, in the specific area of use of force and complaints, was conducted in Rialto, California.[9] The "Rialto Experiment" showed that the likelihood that police use force when officers do not use BWCs was roughly twice that of when officers use BWCs and that the number of complaints lodged against officers dropped from 0.7 complaints per 1000 contacts to 0.07 per 1000 contacts.[10]

The Rialto Experiment was widely cited in recent cases of police use of force as a method to reduce the likelihood of these incidents.[11] The death of Eric Gardner in Staten Island, New York after police put him in a chokehold for several seconds, in contravention of the departmental prohibition;[12] the death of Michael Brown in Ferguson, Missouri, which resulted in protests in 2014;[13] and the shooting of Walter Scott by a white North Charleston police officer[14] are examples thereof. Some, including the current White House Administration, have argued that BWCs could be used as a technological advent that would revitalize police–public relations and

---

generally Helen Nissenbaum, *Protecting Privacy in an Information Age: The Problem of Privacy in Public*, 17 L. & PHIL. 559 (1998) (discussing the legal issues and questions arising from new privacy concerns).

[9] *See* Ariel et al., *supra* note 4.

[10] *Id.* at 510. See Barak Ariel et al.,*'Contagious Accountability': A Global Multi-Site Randomized Controlled Trial on the Effect of Police Body-Worn Cameras on Citizen's Complaints against the Police*, CRIM. J. & BEHAV. (forthcoming).

[11] *See* EUGENE P. RAMIREZ, A REPORT ON BODY WORN CAMERAS 6–11 (2014), https://www.bja.gov/bwc/pdfs/14-005_Report_BODY_WORN_CAMERAS.pdf; Kelly Gates, *Body-Worn Devices and Police Media Labor*, in THE ROUTLEDGE COMPANION TO LABOR AND MEDIA 215 (2015); Fanny Coudert et al., *Body-Worn Cameras for Police Accountability: Opportunities and Risks*, 31 COMPUTER L. & SECURITY REV. 749, 750–51 (2015); Paul Marks, *Body Worn Cameras Mean Police are Always Watching You*, 220 NEW SCIENTIST 21, 21 (2013); Alexandria C. Meetscu & Alex Rosenblat, *Police Body-Worn Cameras*, DATA & SOC'Y 17–21 (2015), http://www.datasociety.net/pubs/dcr/Police BodyWornCameras.pdf. *But see First Scientific Report Shows Police Body-Worn-Cameras Can Prevent Unacceptable Use-of-Force*, UNIV. OF CAMBRIDGE [hereinafter "UNIVERSITY OF CAMBRIDGE"] (Dec. 23, 2014), http://www.cam.ac.uk/research/news/first-scientific-report-shows-police-body-worn-cameras-can-prevent-unacceptable-use-of-force (questioning the study).

[12] *See* Conor Friedersdorf, *Eric Garner and the NYPD's History of Deadly Chokeholds*, THE ATLANTIC (Dec. 4, 2014), http://www.theatlantic.com/national/archive/2014/12/context-for-the-punishment-free-killing-of-eric-garner/383413/.

[13] *See* U.S. DEP'T OF JUST., REPORT REGARDING THE CRIMINAL INVESTIGATION INTO THE SHOOTING DEATH OF MICHAEL BROWN BY FERGUSON, MISSOURI POLICE OFFICER DARREN WILSON (2015).

[14] *See* Michael S. Schmidt & Matt Apuzzo, *South Carolina Officer Is Charged with Murder of Walter Scott*, N.Y. TIMES (Apr. 7, 2015), http://www.nytimes.com/2015/04/08/us/south-carolina-officer-is-charged-with-murder-in-black-mans-death.html?_r=0.

prevent these incidents.[15] Had the officers involved in the incidents cited above been issued BWCs, they may have dealt with these situations differently. The Rialto Experiment was suggested as the necessary evidence to support this contention, including a citation by the United States district judge in the 2013 ruling against the New York Police Department (NYPD) over stop and search.[16] The Rialto Experiment has influenced policy discussions over improvements in police conduct and legitimacy, including the recent discussion by the President's Task Force on 21st Century Policing.[17]

Yet the Rialto Experiment is only one study; replications are urgently required in order to show whether these findings represent an anomaly attributed to the Rialto context, to the novelty of these devices in police operations, or both.[18] Perhaps as important, Rialto is a small department, with about 50 frontline officers force-wide.[19] It remains unknown whether similar effects on police–public encounters would be detected—in both directionality as well as magnitude—in large police departments, within large metropolitan settings.

In the present study, we tested the effect of using BWCs in police frontline operations on police use of force, complaints lodged against officers and arrest, in one of the largest state and local law enforcement agencies in the United States—the Denver Police Department—over a period of six months. One police district out of six was assigned BWCs, while all other districts served as comparison sites without BWCs. We observed the effect of BWCs on these outcomes based on adjusted odds ratios at the aggregated level: comparing the odds of use of force, complaints, and arrest in the 'treatment district' compared to five other districts, as a way to estimate the effect of using BWCs.

After reviewing the existing research on BWCs and examining the

---

[15] *See, e.g.*, PRESIDENT'S TASK FORCE ON 21ST CENTURY POLICING, FINAL REPORT OF THE PRESIDENT'S TASK FORCE ON 21ST CENTURY POLICING 31–32 (2015) [hereinafter "PRESIDENT'S TASK FORCE"] ("An increasing number of law enforcement agencies are adopting BWC programs as a means to improve evidence collection, to strengthen officer performance and accountability, and to enhance agency transparency.").

[16] *See, e.g.*, Floyd v. City of New York, 959 F. Supp. 2d 540 (S.D.N.Y. 2013).

[17] *See* PRESIDENT'S TASK FORCE, *supra* note 15, at 31–32.

[18] One similar replication was recently conducted in Orlando. *See* Wesley G. Jennings et al., *Evaluating the Impact of Police Officer Body-Worn Cameras on Response-to-Resistance and Serious External Complaints: Evidence from the Orlando Police Department Experience Utilizing a Randomized Controlled Experiment*, 43 J. CRIM. JUST. 480, 481 (2015).

[19] *See* Ariel et al., *supra* note 4.

theoretical mechanisms that underpin the effect of these devices on police–public encounters, we next lay out the Denver Police Department experiment and its design. The outcomes of the study are then presented, broken down into different outcomes of interest. The practical implications, with an emphasis on avenues for future research, are contemplated in the discussion chapter, including the methodological limitations of the present study.

I. WHAT DO WE KNOW ABOUT POLICE BODY WORN CAMERAS?

Ariel, Farrar, and Sutherland have recently reported the findings of what is now commonly referred to as the Rialto Experiment.[20] The study, conducted in the small jurisdiction of Rialto, California, with just over fifty frontline officers, compared nearly 500 police shifts in which all police–public encounters were assigned to treatment conditions and an equal number of police shifts to control conditions.[21] During treatment shifts, officers were asked to videotape all their encounters with members of the public, to announce to the parties with whom they have engaged that the encounter was videotaped, and to subsequently store evidence on a secured cloud.[22] In control shifts, the officers were tasked never to use the devices.[23] Outcomes were then measured in terms of officially-recorded use of force incidents and complaints lodged against Rialto police officers.[24] Following this twelve month experiment, Ariel, Farrar, and Sutherland reported a relative reduction of roughly 50% in the total number of incidents of use of force compared to control conditions and a 90% reduction in citizens' complaints, compared to the twelve months prior to the experiment.[25]

The findings have generated heated debates worldwide, particularly around the transferability of the findings to other jurisdictions, or to larger police departments.[26] Whether unique circumstances in Rialto jeopardized

---

[20] *See id.*

[21] *Id.* at 518–19.

[22] *Id.* at 511, 521.

[23] *Id.* at 523 (discussing experimental versus control shifts within a Poisson model).

[24] *Id.*

[25] *Id.* at 523–24.

[26] *See, e.g.*, POLICE EXECUTIVE RESEARCH, *supra* note 5, at 22–24; Kirk Johnson, *Today's Police Put on a Gun and a Camera*, N.Y. TIMES (Sept. 27, 2014), http://www.nytimes.com/2014/09/28/us/todays-police-put-on-a-gun-and-a-camera.html; *see also First Scientific Report Shows Police Body-Worn-Cameras Can Prevent Unacceptable Use-of-Force*, PHYS.ORG (Dec. 24, 2014), http://phys.org/news/2014-12-scientific-police-body-worn-cameras-unacceptable-use of force.html.

the external validity of the test were also raised.[27] Major metropolitan cities, and with them large law enforcement agencies, operate on a different scale to small or even medium sized forces.[28] Larger forces can be exposed to more diverse problems, including a nighttime economy of a different scale than small-scale departments, an incomparable volume of calls for service, and potentially more serious crimes than local agencies.[29] Training, interagency collaborative work and, perhaps, the expertise of officers and how likely they are to use force are potentially different in large versus small police departments, not to mention police cultures, promotional processes, and budgets.[30]

Despite these discussions, additional research on BWCs is virtually nonexistent. The most updated literature review when this study was conducted has concluded that:

> Independent research on body-worn camera technology is urgently needed. Most of the claims made by advocates and critics of the technology remain untested . . . . Researchers should examine all aspects of the implementation and impact of the technology—from its perceived civilizing effect, evidentiary benefits, and impact on citizen perceptions of police legitimacy to its consequences for privacy rights, the law enforcement agency, and other outside stakeholders.[31]

At least in theory, the mechanism which underpins the effect of BWCs on police officers and suspects alike is consistent, regardless of department size. Deterrence and self-awareness theories suggest that people alter their behavior once made aware that they are being observed.[32] A rich body of evidence on perceived social surveillance—self-awareness and socially-desirable-responding—suggests that people adhere to social norms and change their conduct because of their cognizance that someone else is

---

[27] UNIVERSITY OF CAMBRIDGE, *supra* note 11.

[28] *E.g.*, Laure Weber Brooks & Nicole Leeper Piquero, *Police Stress: Does Department Size Matter?*, 21 POLICING 600, 604 (1998); Gary W. Cordner, *Police Agency Size and Investigative Effectiveness*, 17 J. CRIM. JUST. 145, 146 (1989); Robert M. Regoli et al., *Police Cynicism, Job Satisfaction and Work Relations of Police Chiefs: An Assessment of the Influence of Department Size*, 22 SOC. FOCUS 161, 162–63 (1989).

[29] *See* UNIVERSITY OF CAMBRIDGE, *supra* note 11.

[30] Brooks & Piquero, *supra* note 28, at 602–15 (researching the different size models in police stress and how they handle their duties); Kwabena Gyimah-Brempong, *Economies of Scale in Municipal Police Departments: The Case of Florida*, 69 REV. ECON. & STAT. 352, 352–54 (1987); Regoli et al., *supra* note 28; *see also* Victoria M. Follette et al., *Mental Health and Law Enforcement Professionals: Trauma History, Psychological Symptoms, and Impact of Providing Services to Child Sexual Abuse Surviors*, 25 PROF. PSYCHOL. 275, 280–81 (1994) (discussing impact of a person's personal history on how they act professionally).

[31] WHITE, *supra* note 3, at 10.

[32] *See, e.g.*, *id.* at 13; Ariel et al., *supra* note 4, at 516.

watching.[33] We experience public self-awareness, which affects our various social cognitive processes, when we know with sufficient certainty our behavior is observed or judged.[34]

The immediate application of this psychological mechanism is manifested in deterrence theory. An extensive body of recent rigorous research, across several categories of criminal behavior, has shown that when certainty of apprehension for wrongdoing is "strong," socially and morally-unacceptable acts are dramatically less likely to occur.[35] Particularly in terms of crime and disorder, when the consequences of apprehension can be bleak (imprisonment, fines, etc.), people simply do not want to get caught.[36] In this framework, getting caught doing something morally or socially wrong is often registered as behavior that can potentially lead to negative consequences, which is an outcome that rational individuals tend to avoid.[37] Studies have, nevertheless, uncovered a propensity to avoid negative outcomes, and findings generally agree that individuals react compliantly to even the slightest cues indicating that somebody may be watching.[38]

---

[33] Delroy L. Paulhus, *Balanced Inventory of Desirable Responding, in* MEASURES OF PERSONALITY AND SOCIAL PSYCHOLOGICAL ATTITUDES 37, 41–43 (1991); Kristen Munger & Shelby J. Harris, *Effects of an Observer on Hand Washing in a Public Restroom*, 69 PERCEPTUAL AND MOTOR SKILLS 733, 734 (1989); Robert A. Wicklund, *Objective Self-Awareness*, 8 ADVANCES IN EXPERIMENTAL SOC. PSYCHOL. 233, 261–67 (1975).

[34] *See* Pat Barclay, *Trustworthiness and Competitive Altruism Can Also Solve the "Tragedy of the Commons,"* 25 EVOLUTION AND HUM. BEHAV. 209, 217–19 (2004); Will M. Gervais & Ara Norenzayan, *Like a Camera in the Sky? Thinking about God Increases Public Self-Awareness and Socially Desirable Responding*, 48 J. EXPERIMENTAL SOC. PSYCHOL. 298, 301–02 (2012); Manfred Milinski et al., *Donors to Charity Gain in Both Indirect Reciprocity and Political Reputation*, 269 PROC. ROYAL SOC'Y LONDON 881, 881 (2002); Claus Wedekind & Victoria A. Braithwaite, *The Long-Term Benefits of Human Generosity in Indirect Reciprocity*, 12 CURRENT BIOLOGY 1012, 1014 (2002).

[35] ANDREW VON HIRSCH ET AL., CRIMINAL DETERRENCE AND SENTENCE SEVERITY 26–27 (1999); Travis C. Pratt et al., *The Empirical Status of Deterrence Theory: A Meta-Analysis*, *in* TAKING STOCK: THE STATUS OF CRIMINOLOGICAL THEORY 367, 371–74 (2006); Daniel Nagin, *Deterrence in the Twenty-First Century*, 42 CRIME & JUST. 199, 201–04 (2013); Raymond Paternoster, *How Much Do We Really Know About Criminal Deterrence*, 100 J. CRIM. L. & CRIMINOLOGY 765, 769, 771, 774–76 (2010).

[36] Nagin, *supra* note 35.

[37] Steven Klepper & Daniel Nagin, *The Deterrent Effect of Perceived Certainty and Severity of Punishment Revisited*, 27 CRIMINOLOGY 721, 742–744 (1989); Nagin, *supra* note 35, at 251–52. *See generally* Daniel Nagin et al., *Deterrence, Criminal Opportunities, and Police*, 53 CRIMINOLOGY 74 (2015).

[38] *See* Melissa Bateson et al., *Cues of Being Watched Enhance Cooperation in a Real-World Setting,* 2 BIOLOGY LETTERS 412, 413 (2006); Kevin J. Haley & Daniel M.T. Fessler, *Nobody's Watching? Subtle Cues Affect Generosity in an Anonymous Economic Game*, 26 EVOLUTION AND HUM. BEHAV. 245, 254 (2005). *But cf.* Ernst Fehr & Frederic Schneider,

Deterrence and self-awareness work equally on suspects who would otherwise decide to commit crime *and* on police officers who might otherwise break the rules of conduct.[39] For this reason, BWCs are hypothesized to work simultaneously on *both* actors in a police–public encounter.[40] From this follows a logical conclusion that when officers and suspects are cognizant of the BWC, they are equally assumed to have no preference for breaking the rules, as the risk of apprehension and conviction by the evidence captured on videotape is overwhelming. BWCs—unlike CCTV, dashboard cameras or bystanders' mobile-phone cameras—are viewed as "credible threats."[41] It is therefore logical to assume that both parties in the interaction are conscious not only of the fact that they are being watched, but also of the consequences associated with noncompliance.[42] "Getting-away" with rule breaking is thus far less conceivable if one is being-videotaped *and one is cognizant that the behavior is in fact videotaped*.[43] The evidence from the Rialto Experiment supports this model.[44]

II. TESTING THE EFFECT OF BWCS IN LARGE POLICE DEPARTMENTS

To test whether the Rialto Experiment findings are translatable to large, metropolitan law enforcement agencies, we turned to Denver Police

---

Eyes Are on Us, but Nobody Cares: Are Eye Cues Relevant for Strong Reciprocity?, 277 PROC. ROYAL SOC'Y B 1315, 1321–22 (2010) (finding a "null effect" when looking at implicit eye cues).

[39] Ariel et al., *supra* note 4, at 516–18, 527–30.

[40] Barak Ariel, *Technology in Policing: The Case for Body-Worn Cameras and Digital Evidence*, 83 THE POLICE CHIEF 27 (August 2016); Joshua Young, Implementation of a Randomized Controlled Trial in Ventura, California: A Body-Worn Video Camera Experiment 45–46 (Dec. 2014) (unpublished master's thesis, University of Cambridge) (on file with the University of Cambridge Institute of Criminology Thesis Database).

[41] *See e.g.*, ROBERT JERVIS ET AL., PSYCHOLOGY AND DETERRENCE 153 (1989) (discussing deterrence theory and the "role of credible threats in deterring potential aggressors").

[42] *See* Jennings et al., *supra* note 19, at 485.

[43] Drover & Ariel, *supra* note 5 at 89 ("[T]here had been a number of instances where a member of the public had changed their behavior from aggression to reluctant compliance after being informed they were being videotaped.").

[44] Ariel et al., *supra* note 4, at 526. See also Barak Ariel, et al., *Wearing Body Cameras Increases Assaults Against Officers and Does Not Reduce Police Use of Force: Results from a Global Multi-site Experiment*, EUROPEAN J. OF CRIMINOLOGY (2016), currently available at http://euc.sagepub.com/content/early/2016/05/17/1477370816643734.full.pdf+html; Barak Ariel et al., *Report: Increases in Police Use of Force in the Presence of Body-Worn Cameras are Driven by Officer Discretion: a Protocol-Based Subgroup Analysis of Ten Randomized Experiments*, J. EXPERIMENTAL CRIMINOLOGY (2016), currently available at http://link.springer.com/article/10.1007/s11292-016-9261-3.

Department. All response police officers in one district were assigned BWCs, while the other districts were not given BWCs at all. Officers were tasked to conduct patrol "as they normally would," in both treatment and comparison areas, while the only planned difference between the two arms was the deployment of BWCs on all frontline officers in one, but not in other, districts. Official reports of complaints against the police and specifically of incidents of use of force, as well as other police outputs, were measured before deploying the BWCs, and then again during the six months of the experiment, across the entire city. Data was analyzed at the aggregated geographic level (district level) using adjusted odds ratios.

III. METHODS AND DATA

A. EXPERIMENTAL DESIGN

The methodological standard for evaluations of causal estimates is the randomized controlled trial,[45] but these are not always feasible, for practical or political reasons.[46] In this experiment, we were unable to randomly allocate shifts, officers, cases, or vehicles. Instead, we were able to closely observe, prospectively, the deployment of BWCs in one district in Denver, and compare it to the other districts that served as controls. Thus, we were able to apply a Level 3+ on the Maryland Scientific Methods Scale,[47] which can provide informative causal inferences with a fairly satisfactory degree of internal validity—at least in comparison with before–after studies with no control groups—about the effect of BWCs on policing.[48]

B. SETTINGS AND PROCEDURE

Denver, Colorado, is a city that covers approximately 153 square miles and is home to over 650,000 residents.[49] The local population is 46.2% non-

---

[45] WILLIAM R. SHADISH ET AL., EXPERIMENTAL AND QUASI-EXPERIMENTAL DESIGNS FOR GENERALIZED CAUSAL INFERENCE 13 (2002).

[46] *See* Jack R. Greene, *New Directions in Policing: Balancing Prediction and Meaning in Police Research*, 31 JUST. Q. 193, 194–95, 199 (2014) (discussing the limitations of controlled experimentation in police research and possible alternative ways of collecting data about police).

[47] David P. Farrington et al., *The Maryland Scientific Methods Scale*, *in* EVIDENCE-BASED CRIME PREVENTION 13–21 (2002); *see, e.g.*, NAT'L INST. OF JUST., U.S. DEP'T OF JUST., PREVENTING CRIME: WHAT WORKS, WHAT DOESN'T, WHAT'S PROMISING 4 (1998) [hereinafter "PREVENTING CRIME"] (noting the Scale of Scientific Methods ranks studies from 1 (lowest) to 5 (highest)).

[48] *See generally* PREVENTING CRIME, *supra* note 47.

[49] *See* U.S. CENSUS BUREAU, THE 2014 DENVER COUNTY QUICKFACTS, http://www.census.gov/quickfacts/table/PST045215/0820000,08031,00.

White residents (10.1% African-Americans).[50] There are disproportionally more persons living below the poverty line in the city as compared to the rest of the state (18.3% vs. 12%); however, residents of Denver County have a similar per-capita income as the rest of the state—about $34,000 per annum.[51] In terms of crime, Denver experiences normal crime patterns (e.g., 4.7 homicides per 100,000).[52] The police department is one the fifty largest police departments, with nearly 1500 sworn officers working in six geographic districts.[53] As in most major cities, each district is then broken down into many precincts, and each precinct is patrolled by up to two officers in a police car.

BWCs were allocated to all frontline officers in one district (n officers=119) for a period of six months (July 23, 2014–December 15, 2014), but not to any other frontline officers of the other five geographic districts (n officers=513). The single geographic district was therefore the treatment area, while each of the five other districts served as comparison sites.

C. DATA SOURCES

For the purposes of this study, access was granted to a rich database of administrative, as well as geospatial data on all outputs reported internally by police officers, during the six months of the experiment and twelve months prior to the experiment (974,240 code lines).[54] The data was broken down into six police districts, and within these districts, more granular analysis of each outcome was then conducted. We were particularly interested in use of force and complaints as dependent variables, but were quick to learn that arrests—a dimension that was not covered in the original Rialto Experiment—could be addressed as well.

For arrests, however, we were concerned that initiatives specific to individual districts are unique and therefore create statistical noise that would make it difficult to compare the treatment and control conditions.[55] Thus, we did not take into account police-generated arrests resulting from stop-and-account, street checks or unique operations. While our results

---

[50] *See id.*

[51] *See* http://www.census.gov/quickfacts/table/PST045215/08,48089,0820000,08031,00.

[52] *See* http://www.city-data.com/crime/crime-Denver-Colorado.html (2014 data).

[53] *See* http://www.bjs.gov/content/pub/pdf/lpd13ppp.pdf; https://en.wikipedia.org/wiki/Denver Police_Department.

[54] We did not incorporate data prior to twelve months pretreatment as force district boundaries were changed prior.

[55] *See generally* Ariel et al., *supra* note 4.

would therefore be limited to a subset of police–public interactions—victim-generated and witnesses-reported crimes—this tradeoff enabled us to make causal inferences with fewer assumptions that are more difficult to defend.

Another concern was raised when we noticed that the baseline figures are different for the treatment and control conditions. This baseline inequality required statistical adjustments, in order to make the groups more comparable. This comparability is discussed below in more detail. We have taken into consideration the number of victim-generated emergency calls for service (911 calls), as a way to stabilize the pre-treatment conditions. These are the types of calls for service that are less susceptible to data-recording manipulations by the field officers, as they are recorded by call takers, rather than the officers—and could be used as controlling variables.

Overall, access was granted to eighteen months of data on 1184 recorded incidents of use of police force, 844 complaints against police misconduct and 223 complaints against police use of force. The breakdown of the effect of BWCs on complaint types is novel, as the number of complaints post-treatment was too small in the Rialto Experiment for meaningful analyses by complaint type (n=3). Finally, we observed 16,774 unique arrests associated with incidents generated by citizen calls for service.

D. TREATMENT AND COMPARISON GEOGRAPHIC SITES

As noted, the primary methodological challenge in this study was baseline imbalance. District 6, the treatment area, was discernibly different from any other district in the city.[56] Over the years there had been more calls for service to the police, more arrests, more reported incidents of use of force, and more complaints against officers in the treatment area than in any other district. For this reason, the raw between-group measures were insufficient and thus required adjustment to allow for a fair comparison. One methodological option was to select a comparison district that was as close as possible to the treatment district.[57] However, there was no single site, similar to the treatment district, in terms of all dependent variables (use of force, complaints, or arrests). Similarly, a single comparison site might also have been very different due to variability in terms of intra-district organizational culture, the socio-demographic characteristics of the neighborhoods that make up each district, and major policy changes in one

[56] *See infra* Table 1.

[57] *See* PREVENTING CRIME, *supra* note 47, at 4 ("Level 3. A comparison between two or more comparable units of analysis, one with and one without the [treatment].").

area of the city versus another, that could intervene in the causal inference.

Given these comparability challenges—which were predominately due to a lack of the rigorous controlled settings that characterize true experiments (discussed below)—a more conservative test was selected, in which the treatment district was compared to all other five districts in the city, combined within a difference-in-differences test (DID).[58] We were particularly interested in the before–after variations in the outcome variables while comparing these products between the intervention area and comparison areas. Therefore, the use of BWCs was compared against the mean scores of all other districts. This is likely to be referred to as a "Level 4 study" on the Maryland Scale, which is one level shy of the golden standard of evaluation research: randomized controlled trials.[59]

E. APPARATUS

TASER Inc.[60] provided Denver Police officers with BWCs. These body-mounted cameras capture evidence from the officer's perspective; they were affixed to the collar, so were visible to those people who came into contact with the police. Like the Rialto study, officers were not given discretion as to when to use the BWCs, and every enforcement encounter was required to be recorded.[61] The officers were instructed to have the

---

[58] *See* Jacqueline Cohen & Jens Ludwig, *Policing Crime Guns*, *in* EVALUATING GUN POLICY: EFFECTS ON CRIME AND VIOLENCE (2003); Rafael Di Tella & Ernesto Schargrodsky, *Do Police Reduce Crime? Estimates Using the Allocations of Police Forces After a Terrorist Attack*, 94 AM. ECON. REV. 115 (2004); Stephen G. Donald & Kevin Lang, *Inference with Difference-in-Differences and Other Panel Data*, 89 REV. ECON. & STAT. 221, 226 (2007).

[59] *See* PREVENTING CRIME, *supra* note 47, at 5 ("Level 4. Comparison between multiple units with and without the program, controlling for other factors, or using comparison units that evidence only minor differences."). *See generally* SHADISH et al., *supra* note 45, at 13; David Weisburd et al., *Randomized Experiments in Criminology and Criminal Justice*, *in* ENCYCLOPEDIA OF CRIMINOLOGY & CRIMINAL JUSTICE 4283, 4284 (2014) ("There are a wide variety of competing methods in experimental research used to strengthen internal validity, but randomized experiments are considered by many researchers to be the 'gold standard.'"); Barak Ariel, *Deterrence and Moral Persuasion Effects on Corporate Tax Compliance: Findings from a Randomized Controlled Trial*, 50 CRIMINOLOGY 27, 28–29 (2012); Marcia L. Meldrum, *A Brief History of the Randomized Controlled Trial: From Oranges and Lemons to the Gold Standard*, 14 HEMATOLOGY/ONCOLOGY CLINICS N. AM. 745 (2000).

[60] *We Are TASER*, TASER, INC., https://www.taser.com/company (last visited Dec. 30, 2015).

[61] Ariel et al., *supra* note 4, at 520–21. If the officer applies discretion and deviates from the protocol which dictates the videotaping of the encounter—for whatever reason—the deterrent effect of the camera could be nil. It would convolute the study; lacking differences between the experimental and control conditions (i.e., in both groups officers do not use BWCs). In this case, officer discretion becomes an important issue. Indeed, "police work is complex, . . . police use enormous discretion, discretion is at the core of police functioning."

cameras on during every shift and to announce to suspect, victims and witnesses with whom they engaged that the interaction was videotaped. At the end of every shift, officers in the treatment site were required to return to their stations, and to download, tag, and register all the incidents during which evidence was captured on tape.

Notably, once recording commenced, officers did not have discretion nor the technical access to delete footage. The footage would automatically be downloaded to a cloud-based server, with metadata tags for future access. While officers have had access to their own recorded footage and ability to input notes, they were not allowed to delete data.

IV. MEASURES

A. USE OF FORCE

The Denver Police Department ordinarily records use of force incidents, like most U.S. police forces.[62] This standardized tracking system counted the reported incidents during the experimental period in all districts in the city, during the experimental, as well as pretreatment, period. Similar to the Rialto Experiment, we were less concerned with the *types* of force responses, or the eligibility of the use of force incidents (excessive,

---

GEORGE L. KELLING, NAT'L INST. OF JUST., U.S. DEP'T OF JUST., "BROKEN WINDOWS" AND POLICE DISCRETION 6 (1999) [hereinafter "BROKEN WINDOWS"].

Discretion is the essence that underpins policing by consent. Yet, to what extent we should accord officers discretion when using BWCs is currently unclear, mainly because we simply do not know when it is appropriate to use BWCs. Should BWCs be used in every type of incident? When communicating with victims of domestic violence? What data should be stored as evidence, and for how long should they be kept? At which point of the interaction should the device be turned on? Therefore, at this stage of the evidence on BWCs, discretion should not be given to officers. To illustrate, think of the following scenario: a study on BWCs in which two police districts—one with and one without BWCs—participate. Assume that the "treatment district" allows full discretion to its officers on when or how to use the devices. Also assume that BWCs have a cooling off effect that reduces the use of police force. It is not unlikely, particularly in critical incidents where the devices would have an effect, officers will not turn the cameras on, or on time. There is risk that activating a camera during a tense situation may serve to increase aggression in the citizen/suspect (and thus the officer). Therefore, BWCs should be thought of as one particular intervention for which on-scene discretion should be relinquished, and *every* encounter save certain crime types should be videotaped from the very first moment of the encounter. No-discretion is contained in police in-car and dash cams, as well as CCTV in interrogation rooms.

[62] *See* Geoffrey P. Alpert & Michael R. Smith, *Police Use of Force Data: Where We Are and Where We Should Be Going*, 2 POLICE Q. 57, 57–58 (1999); *see also* Matthew J. Hickman et al., *Reliability of the Force Factor Method in Police Use of Force Research*, 18 POLICE Q. 368, 369 (2015).

disproportional, or illegal);[63] we operationalized the "use of force" dependent variable as whether force was used or not.[64] We counted the number of these use of force incidents in each district, during pretreatment (baseline) as well as post-treatment periods.

B. CITIZEN COMPLAINTS

As in other forces, complaints filed against the police by citizens are tracked by the Denver Police Department.[65] These measures are often used in policing studies to illustrate how officers adhere to internal rules of conduct, as deviations from these regulations can potentially be construed as signals of noncompliance.[66] Here, as well, we counted the number of complaints *filed* (as opposed to *processed*) against police officers in the treatment, as well as comparison, districts, both before and after assignment to treatment and control conditions.

To be sure, it is not entirely clear how to interpret a high or low prevalence of complaints, and what, if anything, they represent.[67] On the one hand, complaints may be construed as signs of misbehavior. Whenever

---

[63] Ariel et al., *supra* note 4, at 521–22.

[64] Much can be said about the crudeness of this binary measure, which we are unable to dissect in the limited scope of the present Article. The specific context and the causal mechanisms in which force is used is still contested, including what party—officer or suspect—initiated the forceful contact with the other party. *See, e.g.*, Darren Henstock & Barak Ariel, *Testing the Effects of Body-Worn Video on Police Use-of-Force Beyond Restraint in Arrests: A Randomised Controlled Trial* (forthcoming 2016); *see also* Ariel et al., *supra* note 4, at 521–22 ("[I]t is nearly always up to the individual officer to account for those incidents where force was used. Given the subjectivity of this variable and the measurement problems . . . we therefore relied on these official written reports, but not without hesitation. Specifically in our study, our dependent variable only indicates whether or not force was used, but it does not say 'how much' force was used. The 'amount' of force used is also up to the officer to write down, as he or she recollects it."). Indeed, BWCs may provide some evidence, as the incident is recorded and can demonstrate, at least from the officer's perspective, who "threw the first punch," why and under which conditions force is more likely to occur in these encounters, however this qualitative assessment also goes beyond the scope of the present article. Future research should look more closely at the context of use of force in light of the use of BWCs, more granularly, by breaking down the use of force variable into the different types of forces that can be used in police–public contacts.

[65] Andrew J. Goldsmith, *What's Wrong with Complaint Investigations? Dealing with Difference Differently in Complaints Against Police*, 15 CRIM. JUST. ETHICS 36 (1996).

[66] Ariel et al., *supra* note 4, at 515; *see, e.g.*, Anthony A. Braga et al., *Pulling Levers Focused Deterrence Strategies and the Prevention of Gun Homicide*, 36 J. CRIM. JUST. 332, 335–40 (2008) (comparing incident reports of gun homicide from subject police department with data from police departments in similar sized cities).

[67] Ariel et al., *supra* note 4, at 515, 522.

a party feels aggrieved, a way to restore these feelings of injustice is by formally complaining about the conduct, aftermath, and overall attitude of the officer, in light of what the complainant has perceived was unfair treatment.[68] In this respect, *more* complaints would be viewed as *more* problems for the department to deal with, as a higher prevalence of reports mirrors a higher prevalence of noncompliance with the rules that govern officers' behavior. On the other hand, *more* complaints could also be interpreted as a "good" thing, because they suggest that citizens have not "lost hope in the system" and accept that processes will be revisited, officers reprimanded as necessary, and restitution will be made.[69] While this interpretation is not mutually exclusive of the first, it is nevertheless difficult to ascertain what the equilibrium point would be, or the optimal number of complaints that balances between the two.

There is, however, a third interpretation which must be recognized, adding yet another layer of complexity: it is not too uncommon for some members of the public to file a complaint against an officer in spite; spuriously, frivolously, or, indeed, maliciously.[70] Some complaints are filed when the complainant is cognizant that the outcome of the interaction with the police, the procedure in which it was conducted, or both, were in fact legal, proportional, and "professional"; yet the citizen, nevertheless, complains.[71]

Regardless of the motivation for lodging a complaint, and whatever the interpretation of the court might be, it can be agreed that complaints are costly;[72] most departments would be only too happy to reduce them to a

---

[68] *See, e.g.*, MIKE MAGUIRE & CLAIRE CORBETT, A STUDY OF THE POLICE COMPLAINTS SYSTEM 55–58 (1991) (discussing the various reasons and needs people have for complaints); Ian Waters & Katie Brown, *Police Complaints and the Complainants' Experience*, 40 BRIT. J. CRIMINOLOGY 617, 621–622 (2000) (discussing the Police Complaints Commission and effects it had on alleviating the unfair feelings felt by individuals).

[69] Ariel et al., *supra* note 4, at 515; *see* MAGUIRE & CORBETT, *supra* note 68, at 57–58 (examining the reasons why people file police reports and how their complaint experience impacts their perception of the police); *see also* Waters & Brown, *supra* note 68, at 633–35 (finding that the majority of complainants surveyed lost confidence in the police after filing a complaint).

[70] *See* Tim Prenzler et al., *Complaints Against Police: The Complainants' Experience*, 1 J. CRIM. JUST. RES. 1 (2010); Waters & Brown, *supra* note 68, at 621–622.

[71] John Liederbach et al., *Is It an Inside Job? An Examination of Internal Affairs Complaint Investigation Files and the Production of Nonsustained Findings*, 18 CRIM. JUST. POL'Y REV. 353, 370 (2007).

[72] *See* Alan Ray Stafford, *Lawsuits Against the Police: Reasons for the Proliferation of Litigation in the Past Decade*, 2 J. POL. & CRIM. PSYCHOL. 30 (1986); *see also* Goldsmith, *supra* note 65.

minimum.[73] In the U.S. context especially, complaints can be quite expensive, and, in large police departments, can engender multimillion-dollar settlements, not to mention investigative, litigation, and organizational expenses.[74] Thus, *any* apparatus that can reduce not only the number of complaints, per se, but also the *reasons* for lodging a complaint, can be considered beneficial. Therefore, we used the data captured by the department to count the number of complaints filed against police officers as a main outcome of interest. We observed both the total number of complaints for police misconduct and the total number of complaints filed against use of force in the pre-treatment and post-treatment periods in all districts.

C. ARRESTS

We observed the number of arrests (for any offense) made by the officers in each district (again, before and after treatment assignment). However, counting arrests is not a straightforward measure in respect to how BWCs would affect its occurrence. First, arrest should not be considered an outcome of police actions but, rather, an *output*, and as such can change on the basis of local policies, investigative requirements, and the perceived dangerousness of the suspect.[75] The frequency of applying the alternatives—verbal warnings, requests to meet the police at the station at a later date, cautions, etc.—can, therefore, change as well based on local customs, including intradistrict cultures.[76]

Second, it is not clear whether BWCs would reduce or increase arrest records: on the one hand, in some instances where previously the police officer would have applied alternatives to arrest, now the recording "of everything" might increase an averseness to risk by the officer. Put differently, officers who would otherwise close the case with a caution or a warning might instead apply the most common denominator—arrest. Some

---

[73] *Id.*

[74] *See, e.g.*, http://www.huffingtonpost.com/moneytips/largest-legal-settlements_b_8122202.html.

[75] *See generally* Douglas A. Smith & Christy A. Visher, *Street-level Justice: Situational Determinants of Police Arrest*; *Decisions*, 29 SOC. PROBS. 167, 167–68, 173 (1981); Douglas A. Smith et al., *Equity and Discretionary Justice: The Influence of Race on Police Arrest Decisions*, 75 J. CRIM. L. & CRIMINOLOGY 234, 235 (1984).

[76] William Terrill & Stephen D. Mastrofski, *Situational and Officer-Based Determinants of Police Coercion*, JUST. Q. 215, 234–35 (2002) (describing a "control" independent factor where the Indianapolis police "crackdowns and aggressive stops" differed from the St. Petersburg "problem solving and community organizing" ways).

refer to this phenomenon, albeit in a different context, as "net widening."[77]

On the other hand, the use of BWCs could, instead, result in *fewer* arrests. The *need* for arrest could potentially decrease, as a result of the suspect presenting a less confrontational demeanor in response to being videotaped. A major predictor of both use of force and, more broadly, arrest is the way in which the suspect responds to the interaction with the officer.[78] Demeanor goes hand in hand with additional facilitators of the decision to arrest: suspects' resistance,[79] legal cues,[80] or disrespect.[81] Therefore, if the suspect is non-confrontational, non-threatening, and compliant, an arrest is less likely.[82] BWCs are then hypothesized to have a "cooling off" effect on the police–public interaction *anyway*,[83] and, therefore, one conceivable output is fewer arrests.

Furthermore, the decision to arrest may be altered when BWCs are used as well. Officers' administrative decisions to arrest often go uncontested if executed properly. If the arrest follows guidelines, courts would seldom interfere with the officer's discretion and subsequently his or her decision to bring a suspect into custody. In many ways and when considering the alternatives, making an arrest is the easiest option when dealing with suspects, especially when the "amount" of evidence necessary to justify the arrest is actually very minimal.[84] More importantly, when

---

[77] Thomas G. Blomberg & Julie Mestre, *Net-Widening*, *in* I THE ENCYCLOPEDIA OF THEORETICAL CRIMINOLOGY 573, 574–75 (J. Mitchell Miller ed., 2014).

[78] *See* Michael D. Reisig et al., *Suspect Disrespect Toward the Police*, 21 JUST. Q. 241, 242, 262–64 (2004); Terrill & Mastrofski, *supra* note 76, at 219.

[79] Terrill & Mastrofski, *supra* note 76, at 219.

[80] *Id.* at 217.

[81] Reisig et al., *supra* note 78. *But cf.* Robin Shepard Engel et al., *Further Exploration of the Demeanor Hypothesis: The Interaction Effects of Suspects' Characteristics and Demeanor on Police Behavior*, 17 JUST. Q. 235, 237, 255–57 (2000) (finding no statistical significance in demeanor).

[82] Smith & Visher, *supra* note 75, at 169 ("The demeanor of the suspect also influences police decisions to invoke the law. . . . [R]esearch indicates that antagonistic or hostile suspects run a greater risk of being arrested").

[83] Ariel et al., *supra* note 4, at 517.

[84] *E.g.*, Lathers v. United States, 396 F.2d 524, 531 (5th Cir. 1968) ("An officer need not be astronomically precise before making an arrest."); Overstock Book Co. v. Barry, 305 F. Supp. 842, 850 (E.D.N.Y. 1969) ("To arrest someone [sic], a police officer does not have to determine first that the law under which he is acting will later be found to be constitutional by a court."); Joseph G. Cook, *Probable Cause to Arrest*, 24 VAND. L. REV. 317, 318–38 (1970) (laying out the various methods for proving probable cause to arrest in factual scenarios); Caleb Foote, *Fourth Amendment: Obstacle or Necessity in the Law of Arrest*, 51 J. CRIM. L. CRIMINOLOGY & POLICE SCI. 402, 402–03 (1960); Wayne A. Logan, *An Exception Swallows a Rule: Police Authority to Search Incident to Arrest*, 19 YALE L. & POL'Y REV. 381, 391–400 (2001); Amanda L. Robinson & Meghan S. Chandek, *The*

aligning the word of the officer against the word of the suspect, we axiomatically place more credence to the former rather than the latter.[85] Can this axiom now be challenged when BWCs are introduced? Would officers think twice before arresting suspects and subsequently use this tool less frequently when equipped with BWCs?

Ideally, we would observe all arrests during the experimental period. However, as alluded to earlier, we observed arrest counts associated with victim-generated calls for service, not arrests following proactive policing, such as stop-and-account, crackdowns, or street stops. Arrests associated with proactive policing are policy-dependent (see above), and the intragroup variance—that is, differences between the conditions in the treatment site and the comparison sites—was too great and cannot be controlled statistically. On the other hand, we have made an assumption that, broadly speaking, arrests following victim-generated calls for service are less susceptible to proactive policies and the likelihood of an arrest under no-treatment conditions are broadly stochastic. The decision to exclude street checks and stop-and-accounts obviously dilutes the potential magnitude of the effect but, nevertheless, clears out some of the statistical noise associated with natural variations between the study conditions.

D. CITIZEN-INITIATED 911 CALLS FOR SERVICE

We measured the total calls for service initiated by the public (e.g., victims and witnesses) as opposed to events initiated by the police officers themselves in each district, broken down into pretreatment and post-treatment periods. This measure, however, was primarily used as a stabilizing variable for the aggregated data: the number of 911 calls was not the same across the districts, and this hinges on different workloads the different geographic regions experienced. With this variable, we were able to create more balanced groups with less heterogeneity between the groups at baseline by measuring the outcome variables as a rate of the calls for service in the district.

V. STATISTICAL PROCEDURE

We used adjusted odds ratios (OR) to assess the differences and to compare the responses (Y: the outcome variables) according to the value of

---

Domestic Violence Arrest Decision: Examining Demographic, Attitudinal, and Situational Variables, 46 CRIME & DELINQ. 18, 19, 32–33 (2000); William B. Waegel, *Case Routinization in Investigative Police Work,* 28 SOC. PROBS. 263, 263 (1981).

[85] Jennifer Groscup & Steven D. Penrod, *Battle of the Standards for Experts in Criminal Cases: Police v. Psychologists*, 33 SETON HALL L. REV. 1141, 1148 n.32 (2002).

the explanatory variable (X: BWCs or controls). With the aggregated data, we had two binary variables that each had only two possible levels (counts of observations at each level), displayed in a 2 x 2 contingency table. We therefore used the total counts as the denominator (pretreatment + post-treatment) and the number of events within the post-treatment period only as the numerator, and computed the OR for each outcome variable. However, as we were aware that the treatment group was not similar to the control areas (it is 'hotter' than other places), our measures were stabilized by incorporating the number of 911 calls for service each district experienced and extracting the rate per 1,000,000 calls. We measured the outcomes—use of force; complaints for "general" misconduct; complaints against use of force; and arrests—for the pretreatment and post-treatment periods for the treatment and control districts. We carried out this procedure twice, once by comparing each comparison district with the treatment district (five times) and again by comparing the pooled controls against the treatment districts.[86] We also measured 95% confidence intervals, in order to assess the significance of these results.

Figure 1

$$\widehat{OR}^{87} = \frac{\left(Tn_{outcome}/Tn_{cfs}\right)\Big/\left(TN - n_{outcome}/TN - n_{cfs}\right)}{\left(Cn_{outcome}/Cn_{cfs}\right)\Big/\left(CN - n_{outcome}/CN - n_{cfs}\right)}$$

VI. QUALITATIVE ANALYSES: OFFICERS' SURVEYS

In order to qualitatively explore the effect of BWCs on police officers, we conducted surveys in the treatment district. All 119 officers were approached with a request to fill out an online questionnaire aimed to understand how they viewed the use of BWCs, what impact the devices may have on their sense of self-legitimacy, and whether or not they viewed the devices positively or negatively. Notably, we did not conduct surveys with officers in the non-treatment conditions, so the results of these surveys are limited to one arm of the experiment only and, therefore, cannot be used as measures of treatment outcomes. Still, the findings are informative.

[86] We are unable to perform a meta-analysis on the data as combining all five comparisons meta-analytically violates the assumption that the inter-group comparisons are independent of one another (they cannot be as the treatment group is always the same). This approach was not feasible; instead, the pooled sample of all controls was used to show the overall ORs.

[87] Per 1,000,000 calls.

These main findings are more robust elsewhere;[88] however, herein we provide the responses of officers about two open-ended items. First, we asked officers: "Is there something else you wish to say about your *expectations* for BWCs in police work?" This open-ended question was meant to allow officers to express their perceptions about how BWCs would affect their performance and police work day-to-day. Second, we asked officers to tell us whether "there [was] something else [they] wish[ed] to say about [their] *fears* for BWCs in police work?" Here, as well, we were keen to explore the officers' perceptions about what they see as threats to their work environment. Hereunder, we report the responses associated with the effect of BWCs on officers' decision to arrest.

VII. RESULTS

A. DESCRIPTIVE STATISTICS

Table 1 presents pretreatment and post-treatment raw figures on the outcome variables. As shown, there were over 924,457 citizen-initiated 911 calls for service in the study period; however, the counts substantially varied between the districts, with District 6 (treatment area) situated in the upper-bound of this range. The area experienced more arrests—in absolute terms—than any other area. Differences in these two indications—arrests and calls for service—suggest different levels of activity that took place in the treatment area compared to other areas and strengthen the need for adjustments at baseline prior to any testing. Our two major outcomes of interest—use of force and complaints against the police—were also at the upper bound of the range of counts at baseline.

[88] Barak Ariel & Justice Tankebe, *Racial Stratification and Multiple Outcomes in Police Stops and Searches*, POLICING & SOCIETY (forthcoming 2016), currently available at http://www.tandfonline.com/doi/full/10.1080/10439463.2016.1184270.

Table 1
Before and After Raw Measures Between Treatment (District 6) and Five Comparison Conditions

		District 1	District 2	District 3	District 4	District 5	District 6
911 Calls for Service	Pre-treatment*	99,647	102,514	121,572	86,548	53,044	105,482
	Post-treatment^	56,471	60,650	76,848	55,393	34,889	71,399
Arrests	Pre-treatment	1,690	1,598	2,132	1,673	1,326	2,718
	Post-treatment	854	782	1,053	995	679	1,274
Use of Force Incidents	Pre-treatment	101	118	135	157	58	210
	Post-treatment	67	49	57	77	44	111
Misconduct Complaints	Pre-treatment	83	120	91	84	30	109
	Post-treatment	44	63	64	41	33	82
Use of Force Complaints	Pre-treatment	10	17	14	22	6	42
	Post-treatment	18	18	23	11	8	34

^ 6 months of data (6/23/14–12/15/14); * Pre-Treatment (7/01/2013–6/23/2014).

B. TREATMENT OUTCOMES

Table 2

Use of Force, Complaints, and Arrests: Treatment Area vs. Control Areas: Odds Ratios (OR)

	Complaints – Misconduct			Complaints - Use of Force			Use of Force			Arrests		
		95% CI			95% CI			95% CI			95% CI	
Groups	OR	Lower Limit	Upper Limit	OR	Lower Limit	Upper Limit	OR	Lower Limit	Upper Limit	OR	Lower Limit	Upper Limit
Dist. 1	1.188**	1.045	1.352	0.375***	0.289	0.487	0.668***	0.600	0.743	0.777***	0.754	0.799
Dist. 2	1.253***	1.113	1.410	0.668**	0.530	0.843	1.113†	0.995	1.244	0.837***	0.812	0.863
Dist. 3	0.999	0.878	1.138	0.460***	0.357	0.592	1.168*	1.042	1.310	0.886***	0.861	0.913
Dist. 4	1.458***	1.284	1.656	1.527***	1.215	1.918	1.019	0.926	1.122	0.745***	0.725	0.766
Dist. 5	0.665***	0.582	0.760	0.590***	0.454	0.767	0.677***	0.610	0.752	0.889***	0.866	0.914
Pooled Controls	1.136*	1.001	1.288	0.650***	0.512	0.827	0.928	0.834	1.031	0.820***	0.797	0.844

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$; † =.061

Use of Force

Looking at the pooled ORs in Table 2, the estimates suggest that the odds of reporting of use of force by police officers in the treatment area did not change significantly compared to controlled conditions (OR=0.93, 95% CI 0.834–1.031). There is considerable variability between the different districts—ranging between OR=0.67 in District 1 and OR=1.17 in District 3 (Q=98.98; p<0.001); yet, overall, the comparisons show no discernable effect of BWCs in Denver on the likelihood of reporting of use of force.

Complaints Against the Police

When observing the overall fluctuations from the year prior to the experimental period and the six months of the study, we can see that the

overall number of complaints (against both misconduct and use of force) *increased* by 38%[89]—or 1105 at pretreatment compared to 1524 post-treatment. These findings contradict the findings from the Rialto Experiment, where complaints have declined by nearly 90%.[90] Notably, however, this result is not experimental, as it looks at the *overall* fluctuations in complaints, including variations in the control districts. This increase does not take into account the number of calls either.

When looking at between-groups outcomes, the odds of a complaint for misconduct filed against officers in the control areas was 14% higher than in the treatment area (OR=1.136, 95% CI 1.001–1.288). Variations between the comparison groups emerged as well, with the odds of complaint ranging from 0.67 in District 5 to 1.46 in District 4, to no discernable difference between the odds for treatment District 6 and District 3.

Overall, when looking at the specific subcategory of complaints filed against the police for use of force, we find that the odds of a complaint in *control* districts was 35% higher compared to the treatment district (OR=0.650, 95% CI 0.512–0.827). The pattern was maintained in the pairwise comparisons with Districts 1, 2, 3, and 5, but not with District 4, where odds for complaints against use of force went up compared to the treatment conditions (Table 2).

Arrests

The overall odds of an arrest was significantly reduced in treatment conditions compared to controls (OR=0.820, 95% CI 0.797–0.844), and this pattern emerged across all comparisons. The odds of an arrest was overall about 18% higher in control conditions compared to treatment area.

Qualitative Outcomes

Officers expressed views that emphasized the causal estimates described above. Two particular expectations shared by officers are noteworthy. Speaking about how BWCs are perceived as mechanisms of control over officers, one officer remarked that: "Big Brother eye in the sky has just landed on our heads! . . . There is no more honor in this world, only lawsuits." Another shared this sentiment, further emphasizing that BWCs

---

[89] We annualized the number of complaints and observed the ratio between the pretreatment and post-treatment periods, or $\left\{1-\left(\sum \frac{2*n_{post}}{n_{pre}}\right)\right\}$.

[90] Ariel et al., *supra* note 4, at 523–25.

"will hinder officer initiated police work."

More pronounced responses were expressed as fears that BWCs will impede police work; many officers viewed BWCs as a means of taking away their discretion and introducing enhanced liability for decisions they would otherwise make more freely. For instance, one officer claimed that:

> Arm chair quarterbacks will dissect every word and every action said and done in milliseconds. Frame by Frame the officer will be criticized for acting, re acting or not acting at all. The Youtube community, however, will have a grand 'ol time bashing police officers who are working hard to protect the civilian public they are sworn to protect. Cops are human after all. What's next, cameras in the cock pit because we want to make sure the pilot doesn't have a human moment. We put our lives in the hands of pilots and doctors and I don't see doctors or pilots wearing BWV's, and if they did, I would be a little disturbed about it. It's all about private corporations making money, period.

Another officer commented that: "I would like to be able to review the footage of my interactions as many times as necessary for me without fear of being asked to articulate why I did it." And another officer wrote:

> The current [BWCs] policy that has been written by this department gives the Internal Affairs Bureau the ability to make arbitrary discretion . . . . [T]his seems like a useless policy unless the goal of the department is to trap officers in false statements due to differences of perception.

The ability to 'forgo' certain decisions was raised as well:

> The standard for keeping/deleting video should be the same for police as it is for the citizens: If anyone with a cell phone camera can delete footage they don't like, so should the police. Police should also have the option when to record their interactions with the public (it shouldn't be mandatory to record every contact/call).

Mistrust was another key dimension raised by officers: "I fear that the use of this technology shows an increase in the trend of lack of trust in police officers both by the public and by those in management. My word and the fact that I already hold myself to a higher standard no longer matter."

Officers also expressed doubt about how footage would be viewed by the public or line managers, stating "Police work can be messy. Having actions reviewed from a seat after the fact can be too easily abused by the public or administration," and that "the general public may not understand or like how officers at times have to talk or behave towards the criminal element to gain their cooperation in following orders."

VIII. DISCUSSION AND CONCLUSIONS

The proliferation of the implementation of BWCs in the United States continues.[91] If it is of any indication, the share value of the leading company in the production of these devices—TASER International Inc.—has continued to soar since the results of the Rialto Experiment began to surface.[92] The political and public pressure to procure these devices will continue unabated so long as they are pushed as a panacea to virtually all issues with policing in the 21st century.[93] However, even if they could be a game-changer, the scope of rigorous evidence currently available is insufficient to support such a claim. BWCs are promising, but under what conditions they 'work' is still unclear. We *must* be cautious with our limited public budgets, and we ought to be hesitant about great promises, particularly when there is as much a likelihood of a backfiring effect to using BWCs in police operations as there is to unmitigated success.[94] Would BWCs increase the likelihood of use of force in some other forces? Would police legitimacy be jeopardized? Will the testimony of officers be conditional of recorded footage?[95] In the current state of affairs, when published evidence is severely lacking, we do not know. While there seems to be great promise that BWCs can have a "cooling off effect" on police–public engagements—owed specifically to deterrence theory[96]—more research is needed, on as many issues as possible, with as many jurisdictions as possible.

In this study, we aimed to expand our understanding of the effect of BWCs in large police departments. The Denver Police Department is an example of such a force. We complicated the Rialto Experiment findings further, by adding an additional layers to the use of force and citizens'

---

[91] *Research on Body-Worn Cameras and Law Enforcement*, NAT'L INST. JUST., DEP'T OF JUST., http://www.nij.gov/topics/law-enforcement/technology/pages/body-worn-cameras.aspx (last visited Dec. 30, 2015).

[92] *See TASER International, Inc. Stock Chart for Dec. 30, 2014 through Dec. 30, 2015*, NASDAQ, http://www.nasdaq.com/symbol/tasr/stock-chart (last visited Dec. 30, 2015). *But see id.* (noting an overall decline in price since mid-July 2015).

[93] Adam Bannister, *Body-Worn Cameras: a Panacea for Policing Problems? Or a Regulatory and Technological Minefield?*, IFSEC GLOBAL.COM (June 27, 2014), http://www.ifsecglobal.com/body-worn-camera-trials-can-police-surmount-regulatory-technological-challenges/.

[94] Ariel & Tankebe, *supra* note 88.

[95] *See* Tim Cushing, *Indiana Supreme Court Declares an Officer's Testimony is More Reliable Than Video Evidence*, TECHDIRT (Apr. 10, 2014, 7:19 AM), https://www.techdirt.com/articles/20140405/17142626817/indiana-supreme-court-declares-officers-testimony-is-more-reliable-than-video-evidence.shtml.

[96] *See* Ariel et al., *supra* note 4.

complaints dimensions: first, we looked at additional outcomes—the productivity of policing, measured by arrest counts. We believed there was logic behind a causal mechanism which stipulates that variations in productivity would follow the use of BWCs—except we did not know in which direction: Would BWCs cause officers to "think twice" about the need for an arrest (i.e., reduction in arrests), would BWCs cause officers to terminate more encounters with an arrest, being a common denominator for the risk-averse officer (increase in arrests), or will BWCs reduce the need to make an arrest, as the interaction between the suspect and the officer would be less aggressive, thus allowing the officer to continue with a criminal justice outcome via alternative methods?

The second layer we explored was methodological in nature, and was to change the unit of analysis from shift-based[97] to large aggregated police district level. This analytical approach looked at the adjusted odds ratio of any one of these four outcomes (use of force, complaint against misconduct, complaints on use of force, and arrests), in one district where BWCs were deployed, in comparison with the odds of these events occurring in the five other districts that served as controls.

Before we discuss the findings more robustly, we note that taking into account the number of victim-generated calls for service in order to create baseline equality between the groups is useful, but not perfect. This procedure was necessary because the outcome variables at pretreatment levels were inconsistent across the study conditions. We assumed that victim-generated 911 calls are exogenous to police policies. As the volume of calls dictates so much about policing, taking them into consideration was assumed to take away some of intergroup variance—despite the fact that variability was expected, given the natural differences that exist between police districts in large metropolitan cities. Methodologically, this model will always be susceptible to alternative explanations,[98] as we can only rule out alternative explanations to the causal inference asymptomatically. Incorporating 911 calls may create some intergroup balance, but it is not enough for making a relaxed assumption about baseline equilibrium. Future studies might benefit from other statistical procedures, such as propensity score matching techniques, to overcome baseline inequality. Another

[97] Barak Ariel & William A. Farrar, *Rialto Police Department Wearable Cameras Experiment: A Criminological Protocol for Operating Randomized Trials*, *in* UNIVERSITY OF CAMBRIDGE RESEARCH: REGISTRY OF EXPERIMENTS IN POLICING STRATEGY AND TACTICS 5 (2012), http://www.crim.cam.ac.uk/research/experiments/rex-post/rialto.pdf.

[98] PREVENTING CRIME, *supra* note 47; SHADISH ET AL., *supra* note 45; *see* Lawrence W. Sherman & Dennis P. Rogan, *Effects of Gun Seizures on Gun Violence: "Hot Spots" Patrol in Kansas City*, 12 JUST. Q. 689 (1995) (discussing the methodology).

approach is to use street segments as the unit of analysis and measure the treatment effect within comparable hotspots; hotspots are stable and consistent, and can therefore be used to somewhat stabilize baseline imbalances.[99] More broadly, these design concerns illustrate the superiority of randomized controlled trials (RCT) in the assessment of causal inference: it is unlikely that a properly designed experiment, with sufficient statistical power to detect significant effect sizes about the magnitude of the difference between treatment and control conditions that were randomly assigned, would face similar jeopardies to the internal validity of the test.[100] Our Level 3, possibly 4 study, on the Maryland Scientific Scale faces baseline imbalance and susceptibility to the effect of outliers (our degrees of freedom are 5, if the unit of analysis is the geographic district). For this, among other reasons, we strongly recommend future impact evaluations in the area of BWCs to endorse RCT methodologies, as discussed more thoroughly below.

Still, our findings are instructive. We discuss the implications of these findings below, but begin with a summary of the findings. Overall, we found that the likelihood of reporting a use of force incident is no different when BWCs are in use or not; the odds of a misconduct complaint against police officers when BWCs are present are 14% higher than controls, but there are 35% greater odds to attract a complaint *for the use of force* when BWCs are *not* present. Finally, the odds of any arrests went *down* by 18% in the treatment area compared to control areas—which we sense is the primary novel contribution this paper makes. We elaborate on these findings in the following sections.

A. EFFECT OF BWCS ON USE OF FORCE: ACCOUNTABILITY AND TRANSPARENCY

BWCs in Denver have had a non-significant overall effect on use of force. However, compared to three out of the five comparison districts, the odds of officers filing a formal report about the use of force *rose* significantly by more than 15% when BWCs were used by officers in the treatment conditions compared to control conditions. While these increases are not uniform across all comparisons (odds of use of force went down compared to two police districts in Denver, which created an overall non-significant outcome), we find these seemingly counterintuitive increases particularly important for future research. We interpret these findings

---

[99] Barak Ariel, *Increasing Cooperation with the Police Using Body-Worn Cameras*, 19 POLICE Q. 326 (2016).

[100] PREVENTING CRIME, *supra* note 47, at 4–5.

within the framework of accountability and transparency.

When officers use "force," they are nearly always required to file an official report of such incidents, even if only in their pocketbooks.[101] The challenge, however, is that not every physical action on the part of an officer is considered force. The very definition can be subjective, memory-prone, and generally unclear. Adams suggests that use of force occurs "at least twice as often" as suggested by official reports,[102] and it is likely to be the case particularly in incidents of low-level force that do not amount to anything the police officer *feels* he or she needs to account for. In addition, some ethnographic work in this area suggests that what is construed as a "reportable incident of force" and how much force is appropriate, is often predicated by a police department's organizational culture.[103] For example, police subculture in relation to the reporting of use of force plays a role in accepting or allowing for force to be applied in certain circumstances.[104] Researchers who study police organizations have been claiming for years that use of force and subsequently its reporting are a function of police officers' attitudinal commitment to certain institutional or organizational cultures around their roles in society and, more broadly, their view of power.[105] Certain institutional and subcultural codes make police agencies particularly resistant to cultural changes and transparency requirements.[106] Feelings of loyalty sustain this code of silence and make it particularly difficult to investigate purported unnecessary, or excessive, use of force, especially when it goes unrecorded.[107] For example, placing one's hand on another's shoulder in an authoritative way or using aggressive language may be considered use of force in some instances and for some individuals, whereas for others they may not.[108] Measuring "injury" or "assault" is also

---

[101] Henstock & Ariel, *supra* note 64, at 15.

[102] Kenneth Adams, *Measuring the Prevalence of Police Abuse of Force*, *in* POLICE VIOLENCE: UNDERSTANDING AND CONTROLLING POLICE ABUSE OF FORCE 52, 62 (William A. Geller & Hans Toch eds., 1996).

[103] Jennifer Hunt, *Police Accounts of Normal Force*, 13 J. CONTEMP. ETHNOGRAPHY 315 (1985); Jeff Rojek et al., *Examining Officer and Citizen Accounts of Police Use-of-Force Incidents*, 58 CRIME & DELINQUENCY 301 (2010).

[104] *See* Jerome H. Skolnick, *Enduring Issues of Police Culture and Demographics*, 18 POLICING & SOC'Y 35 (2008).

[105] William Terrill et al., *Neighborhood Context and Police Use of Force*, 40 J. RES. CRIME & DELINQ. 291, 292–93, 308–09 (2003).

[106] *See* Skolnick, *supra* note 104, at 37 ("[The] unrecorded code [of silence] has been noted as a feature of policing across continents, wherever commissions of inquiry have investigated police corruption [or not].").

[107] *See id.*

[108] *See* Henstock & Ariel, *supra* note 64.

likely to be challenged in terms of definitional threshold, as it is open to interpretation when there are no clear signs of physical contact. Taken collectively, we see that what needs to be reported or not is not always as clear-cut as it could be.

What does seem to be clear is that the reporting of use of force is closely linked to police accountability and transparency. Sound reporting of use of force is the cornerstone of police accountability. It is essential if officers are to be held responsible for the actions, regardless of whether or not their actions are justified.[109] As reviewed by other scholars, police accountability refers to taking responsibility for the actions of the organization by tracking or measuring its outputs.[110] This requirement demands from the police to be accountable for its performance and to amend it, when necessary.[111] The police must act in the public's interest, and therefore is usually assumed to be held to a higher degree of accountability[112]—especially given the wide powers they hold in modern society. For this and other reasons, Samuel E. Walker contends that:

> [T]he first accountability procedure to be considered involves the direction and control officer use of police authority through formal agency policies. This approach, generically known as administrative rulemaking, is a basic feature of modern police management, if not all public and private sector organizations. Administrative rulemaking consists of three elements: specifying approved and forbidden actions in written policies; requiring officers to file written reports on specific actions; requiring administrative review of officer reports.[113]

While deterrence theory would suggest that forceful encounters will be minimized, it is also logical to see why, once BWCs are mandated in police operations, *reporting* of the use of force could increase. Because the cost of using force without reporting is invariably higher than the cost of the using

---

[109] Stephen D. Mastrofski, *The Romance of Police Leadership*, in CRIME & SOCIAL ORGANIZATION 153 (Elin J. Waring & David Weisburd eds., 2002); Prenzler et al., *supra* note 70, at 15–16.

[110] Mastrofski, *supra* note 109; Prenzler et al., *supra* note 70, at 15–16.

[111] Wesley G. Skogan, *Concern About Crime and Confidence in the Police Reassurance or Accountability*, 12 POLICE Q. 301, 308–13 (2009) (studying the different police and confidence levels and concerns).

[112] Philip Stenning, *The Idea of the Political "Independence" of the Police: International Interpretations and Experiences*, *in* POLICE & GOV'T RELATIONS: WHO IS CALLING THE SHOTS 183, 187–89, 191 (2007); Philip Stenning, *Governance and Accountability in a Plural Policing Environment—The Story So Far*, 3 POLICING 22, 26 (2009).

[113] SAMUEL E. WALKER & CAROL A. ARCHBOLD, THE NEW WORLD OF POLICE ACCOUNTABILITY 94 (2014) ("Critical incidents are a crucial element of police accountability tools, but if officers fail to complete required reports or do not provide complete and accurate data the entire accountability system begins to collapse. . . . [T]here is evidence that officers do not always file required reports.").

and subsequently reporting about "using force," officers in the treatment condition began filing these administrative reports at an increased rate compared to some other districts, potentially recording "force" which they otherwise would have not recorded: compliant handcuffs, hand-to-hand techniques, and possibly, word commands. What once was left to *ad hoc* explanations by officers who did not record "lesser" types of force[114] can no longer be hidden from the radar. BWCs caused officers to become more accountable, because the odds of "getting caught" using force—now on videotape—substantially increased, and by implication has caused officers to file use-of-force records more frequently. Closer observations will be required in the future about the types of forces that officers are now more likely to report—data which we did not have access to in the present study—however, we suspect these behaviors are situated in the lower bands of the force continuum. Still, if our results are credible, they illustrate the implication that BWCs have on police accountability and particularly around the transparency and the reporting of use of force, which continues to be a contentious area in policing.

Still, why has the Rialto Experiment reported a 50% *reduction* in the reported use of force while the present study reports up to 17% *increase* in the reported incidents of use of force against some comparison Districts? We speculate that the discrepancies have to do with the research design and our decision to exclude police-generated activities. In Rialto, the data reflected all police actions that were recorded with BWCs, including stop and search, street stops and various operations initiated by police officers.[115] When Rialto officers proactively engaged with suspects while using BWCs, they have had far more control over the situation, as they initiated the contact.[116] On the other hand, victim-generated incidents are more volatile and the severity of force is greater, as officers would reach offenders in the aftermath of a crime, when the demeanor of suspects is already adversarial or confrontational—compared to circumstances initiated by the police.[117] Given what we know about demeanor,[118] it is likely that

---

[114] Jeff Rojek et al., *Policing Race: The Racial Stratification of Searches in Police Traffic Stops*, 50 CRIMINOLOGY 993, 995 (2012).

[115] Barak Ariel & William Farrar, *The Rialto Police Department Wearable Cameras Experiment (Experimental Protocol)*, CRIM-PORT 1.0 (2009), http://www.crim.cam.ac.uk/research/experiments/rex-post/rialto.pdf.

[116] Ariel et al., *supra* note 4, 526–27.

[117] Joel H. Garner et al., *Characteristics Associated with the Prevalence and Severity of Force Used by the Police,* 19 JUST. Q. 705, 736 (2002) ("In comparison to routine approaches, when an officer is responding to a priority call, more force is used.").

[118] John D. McCluskey et al., *To Acquiesce or Rebel: Predicting Citizen Compliance*

officers in Denver applied force responses to already-heated incidents and were now more compelled to file these incidents for the reasons reviewed above. The officers were *reactive* to an already-existing situation, compared to *proactive* policing when officers can manage and govern the interaction more comprehensively. Future RCTs should review force responses more closely in police-generated encounters and ascertain who instigates an aggressive response against whom, whether any ecological factors are at play in the exacerbation of force responses, such as large audiences (what can be construed as "theater effects"),[119] and to what extent alcohol and drugs moderate the deterrent effect of BWCs on behavior. As for the latter, we must be cognizant of the fact that deterrence theory relies heavily on rational calculations and awareness;[120] for this reason, intoxicated offenders are unlikely to be responsive to deterrent messages or the credible threat of punishment through their videotaped demeanor. Deterrence requires rationality, and as intoxicated suspects are often chaotic, deterrence embodied through BWCs is unlikely to work on them.

In this study, it was not possible to look at police-generated incidents—stop-and-frisks, crackdowns, hotspot policing, etc.—and to observe the effect of BWCs in these situations compared to the other districts. The variations between the districts were too pronounced and could not be controlled for statistically. A randomized controlled trial, with random allocation of units into treatment and control conditions would have created comparable groups in which these baseline differences in proactive as well as reactive policing tactics can be controlled for.[121] This is yet another example of the advantages of using prospective RCTs compared to any other methodology,[122] and why experimental designs are stronger than the alternative designs.

B. EFFECT OF BWCS ON COMPLAINTS: CONDITIONAL ON COMPLAINT TYPE

As the number of complaints in Denver was substantially larger than in Rialto,[123] our experiment can go beyond the crude before–after analyses

---

with Police Requests, 2 POLICE Q. 389, 404–07 (1999) (discussing the impact demeanor and citizen action has on the situation).

[119] David Schweingruber, *Mob Sociology and Escalated Force: Sociology's Contribution to Repressive Police Tactics*, 41 SOC. Q. 371 (2000).

[120] Ronald L. Akers, *Rational Choice, Deterrence, and Social Learning Theory in Criminology*, 81 J. CRIM. L. & CRIMINOLOGY 653 (1990).

[121] *E.g.*, Ariel et al., *supra* note 4, at 520.

[122] PREVENTING CRIME, *supra* note 47, at 3–5.

[123] Ariel & Farrar, *supra* note 97, at 524 (noting there were only three recorded

conducted in the original experiment on the effect of BWCs on citizens' complaints. We are able to report between-group analyses as well. We have also complicated the story further by looking at the type of complaint filed against Denver officers.

In the present study, citizens filed *more* complaints against misconduct in the treatment district, which may include grievances against cursing, disrespectful conduct, or what citizens might otherwise consider as police maltreatment. One interpretation for this finding is that under no-camera conditions suspects felt they cannot make a claim against officers (in other words, "it is my word against his"), but with the evidence captured by the cameras, it is reasonable to assume that citizens have felt they can corroborate their claims against rude or uncivilized mannerism. Drawing from the literature on accountability reviewed earlier, BWCs changed the perceived degree of liability officers can now face and, perhaps, suspects now feel that officers would be more accountable for their incivilities. Future research should consider surveys with complainants in both treatment and control conditions, in order to ascertain their motivation for lodging a grievance report.

On the other hand, we observed a major reduction in the odds of a complaint against the use of force, compared to control conditions. A lower rate of complaints can be viewed as a marker of enhanced perceptions of police legitimacy and satisfaction with police performance, and we therefore interpret the significant reductions as increased legitimacy with District 6 officers compared to control officers, in terms of the application of force. Complaints allow researchers to assess the extent to which police legitimacy is influenced by whether community members perceive police–public encounters that they were treated fairly, with respect and dignity by police officers.[124] It is true that the link between the complaints and satisfaction and police legitimacy overall is tenuous, but it is not confounded, particularly when considering the instances in which reductions in the odds of complaints were observed: use of police force.[125]

This conclusion deserves a closer look, particularly when we reflect on the nondiscernable effect in official recordings of use of force made by officers. One could argue that once BWCs were used, police officers applied the same force (i.e., made officers not more and not less coercive when responding to 911 calls for service) and that suspects complained *less*

---

complaints during the year of the study).

[124] *See, e.g.*, Anthony A. Braga et al., *Losing Faith? Police, Black Churches, and the Resurgence of Youth Violence in Boston*, 6 OHIO ST. J. CRIM. L. 141, 172 (2008).

[125] *Id.*

about these incidents—however, we find this claim implausible. Instead, we argue that police officers became more *accountable* for their use of force in these instances, and likely in the lower manifestation of the force continuum such as verbal (commands and threats) and lesser physical restraint (pat downs or firm grips); and when coercion was applied, it was both justified and proportional. The fact that the odds for a complaint for the use of force were substantially lower when BWCs were used, leads us to conclude that when coercion was applied, it was overall perceived as more appropriate, otherwise the number of complaints for this category of behavior would be indistinguishable from control conditions. This was not the case; as others claim, BWCs serve a "cooling down" mechanism for the use of force—which our data on complaints on the use of force suggest—but also that these devices increase transparency and accountability.[126] In future studies, the *type* of force used should be observed as well in order to see whether there is evidential merit in our stipulations. We can nevertheless make a strong claim that the effect of BWCs on complaints is conditional of the *type* of citizen complaint: an increase in complaints against the use of force, and a decrease in complaints for misconduct. This suggests to us that in future research we should not consider "citizen complaints" as a homogenous signal of police performance and that more granular analysis is required.

C. EFFECT OF BWCS ON ARREST DECISIONS

We found support for the claim that the use of BWCs had an effect on arrests. Our findings suggest that the odds for an arrest were about 18% higher under no-camera conditions. If these estimates are reliable, we can conclude BWCs do not cause net-widening but rather a diversion of encounters that might have led to arrest into alternatives to arrests. An alternative possibility we entertained earlier was that risk-averse officers who wear BWCs would be driven into the most-common denominator in policing—arrest—rather than considering other means to close the case. We raised the argument because arrests are "easier" than the alternative: they are often valued positively by many officers as a way to bring offenders to justice;[127] they fulfill the need of many frontline officers' vision about being

---

[126] Ariel et al., *supra* note 4, at 517–18.

[127] *See* Stephen Armeli et al., *Perceived Organizational Support and Police Performance: The Moderating Influence of Socioemotional Needs*, 83 J. APPLIED PSYCHOL. 288, 293–95 (1998) (discussing similarities with employees helping the company and others helping the police).

crime-fighters;[128] and they escalate the problem into the criminal justice system, which is the classic progression from enforcement into prosecution. However, our evidence did not support this position: arrests went down when BWCs are in use, even though we excluded police-generated actions.

A discussion of the larger context of arrests is required in order to better understand their link to BWCs. While variations in both law and practice exist between different jurisdictions, there are only a very limited number of scenarios in which a police officer can make an arrest: (a) when he personally observes a crime; (b) when he possess "probable cause" to believe the arrestee has committed a crime; (c) when he needs to subdue an aggressive individual from hurting himself or others; and (d) when he has a legal arrest warrant issued by the court.[129] Clearly, an arrest cannot be made because the officer has a vague hunch that the suspect is a criminal.[130] Thus, the officer must be able to justify the arrest, often by showing some "tangible evidence" that led him to probable cause.[131] If an arrestee believes that the arrest was unjustified or incorrect, she may challenge it later, and if warranted, bring a civil rights case.[132] In practice, however, there is a low burden of proof for police officers to justify their decisions to exercise the power of arrest.[133] Even the smallest subjective cues of resistance—tampering with evidence, disrespecting the officer, and presenting as a potentially dangerousness person—provide the necessary justification for an arrest. This includes a broad list of crime categories that can justify the legal requirements for probable cause and tangible evidence.[134] Unlike incidents of use of police force (Taser, batons, deadly force, etc.), which has spurred a fairly elaborate body of case law,[135] the decision to arrest—

---

[128] JOAN C. BARKER, DANGER, DUTY, AND DISILLUSION: THE WORLDVIEW OF LOS ANGELES POLICE OFFICERS 93 (1998).

[129] *See generally* Logan, *supra* note 84.

[130] BARKER, *supra* note 128, at 93.

[131] *Id.* at 95.

[132] *See* Donald A. Dripps, *Criminal Procedure, Footnote Four, and the Theory of Public Choice; or, Why Don't Legislatures Give a Damn About the Rights of the Accused*, 44 SYRACUSE L. REV. 1079, 1094–96 (1993).

[133] *Id.*

[134] Paul Bator & James Vorenberg, *Arrest, Detention, Interrogation and the Right to Counsel: Basic Problems and Possible Legislative Solutions*, 66 COLUM. L. REV. 62, 64–67, 70–71 (1966); Myron Moskovitz, *Road to Reason:* Arizona v. Gant *and the Search Incident to Arrest Doctrine*, 79 MISS. L.J.181, 186–88 (2009).

[135] *See* Anthony G. Amsterdam, *Supreme Court and the Rights of Suspects in Criminal Cases*, 45 N.Y.U. L. REV. 785 (1970); Mark S. Bruder, *When Police Use Excessive Force: Choosing a Constitutional Threshold of Liability in* Justice v. Dennis, 62 ST. JOHN'S L. REV. 735, 741–42 (2012); Petter Gottschalk, *Police Criminality and Neutralization: An Empirical*

although far more prevalent—is difficult to challenge, despite public outcry. It is particularly the case when the distribution of arrests across races and ethnicities is often argued to be uneven: not all races are arrested equally.[136]

Given this framework, one possible interpretation is that BWCs have an effect on police officers' decisions to arrest suspects. With the introduction of BWCs, officers became "cautious" about arresting suspects, as their decision can more easily be criticized. When the camera records what the officer views and hears, an arrest that does not pass the tangible evidence test may be more easily detected. Self-consciousness of being observed (by a BWC),[137] coupled with the credible threat of apprehension for violating rules and regulations associated with the wrong decision to arrest,[138] has significantly lowered the likelihood that officers would use arrest.

If this mechanism sticks, what does it say about *arrest decisions more globally*, or arrests made in control districts? One critical interpretation might be that Denver police officers—and we suspect police officers in general—use arrests far too frequently when many incidents could have been handled through alternatives to arrest.[139] When forced to "think twice" about arresting suspects, officers are required to ask themselves: "Will I get in trouble for my decision to arrest?" Under controlled conditions, the decision to arrest is difficult to oppose and the decision to apply it often goes uncontested. However, when BWCs are used, officers *must* provide a more convincing level of evidence to corroborate their decision to arrest a person.[140] Merely stating "resisting arrest," "violent demeanor," or "known suspect of aggressive behavior" is a necessary, but no longer sufficient, condition to justifying an arrest. It is particularly the case for officers who are "more forceful" in the arrest process than others. Collectively, it is likely that officers in District 6 made fewer arrests because they *should have made fewer arrests* in the first place and consider alternatives,

---

Study of Court Cases, 13 POLICE PRAC. & RES. 501 (2012).

[136] Ariel & Tankebe, *supra* note 88.

[137] Gervais & Norenzayan, *supra* note 34, at 299; Wicklund, *supra* note 33, at 237, 265.

[138] JERVIS ET AL., *supra* note 41, at 3; Nagin, *supra* note 35, at 95.

[139] Lawrence W. Sherman & Heather M. Harris, *Increased Death Rates of Domestic Violence Victims from Arresting vs. Warning Suspects in Milwaukee Domestic Violence Experiment*, 11 J. EXPERIMENTAL CRIMINOLOGY 1 (2014).

[140] *But cf.* Robinson v. State, 5 N.E.3d 362, 367 (Ind. 2014) (holding the trial court's finding that an officer's testimony was more reliable than video evidence was not an abuse of discretion).

arguably in a large number of cases.[141] Future research should look more closely at this possibility, potentially through surveys of officers about their decision to make an arrest or not, in light of the use of BWCs.

There is, however, another plausible explanation, which looks more closely at suspects' demeanor and officers' *response* to the behavior of the suspect. Under this prism, arrests went down in the treatment district compared to the control districts, as a result of using BWCs, because suspects may have behaved differently when the cameras were pointing at them, and that caused their behavioral modifications. Relying on a rather convincing line of research on police–public encounters, a strong predictor of arrest (especially in cases of a police request to cease misbehavior) is the suspects' demeanor.[142] Therefore, if the suspect is nonconfrontational, nonthreatening, and cooperative, an arrest is less likely. In similar ways, as BWCs have a "cooling off" effect on police–public interactions anyway,[143] not only is police force less likely to be needed, but the odds of an arrest altogether dropped, too. The less the suspect aggressively confronts the officer and resists, the less likely the officer needs to arrest the suspect. The antecedent for the decision to arrests, therefore, lies within the suspect.

To be sure, we can only speculate on the reasons for the diminished propensity for an arrest in the treatment group. We did not conduct systematic observations or surveys with officers about their decision to arrest in BWCs-present cases versus BWCs-not-present cases. However, based on the qualitative data we have from the officers' surveys, we are drawn to conclude that the effect of BWCs is mostly on decisions. Officers argued rather explicitly that they feared their choices would be audited and reviewed if BWCs were introduced. The ability of line managers to analyze every decision officers made concerned officers. While officers did not disagree in principle with the idea of using BWCs in police operations, they nevertheless expected that the footage would be used as an additional layer of supervision and accountability. The immediate translation of these perceptions was a behavioral modification, which manifested in fewer arrests. Additional analyses and interviews with officers about these choices seems like the next plausible step in this area of research.

---

[141] *See* Lawrence W. Sherman & Heather M. Harris, *Increased Homicide Victimization of Suspects Arrested for Domestic Assault: A 23-Year Follow-Up of the Milwaukee Domestic Violence Experiment*, 9 J. EXPERIMENTAL CRIMINOLOGY 491, 510–11 (2013).

[142] McCluskey et al., *supra* note 118, at 399–411 (discussing the relation to citizen behavior in a police encounter).

[143] Ariel et al., *supra* note 4, at 517–18.

D. A CAUTIONARY NOTE ON NONEXPERIMENTAL DESIGNS IN FUTURE STUDIES ON BWCS

This paper problematizes the kinds of routine activity and outcome measures that other researchers will assemble to conduct similar studies in the future. We suspect that in the next few years, the literature on BWCs will increase dramatically, particularly when funding bodies have awarded millions of dollars for both implementation and impact evaluation studies.[144] The projected dynamics alluded to in this study must be explored more granularly in future research, which ought to pay closer attention to design and method concerns. First, we alluded to the fact that police data are not necessarily fit for the purpose, because *reporting* of police behavior and police behavior per se are difficult to match, and can be viewed as a form of a reflexivity effect. We rely on official statistics as outcomes and output variables rather heavily, while some of these data points—recorded use of force, decision to arrest, decision to prosecute, etc.—make any causal study challenging to interpret: how should we understand these interaction effects between behavior and reporting of behavior? What additional measures are needed in order to accurately capture the effect of BWCs on policing? Are "reductions" in reporting necessarily a beneficial outcome, and what do they teach us about the complex and delicate relationship between police and communities? These are difficult questions to answer, which future studies will undoubtedly have to face when interpreting their own results.

The second methodological challenge, beyond determining how to appropriately measure results in policing studies, is identifying the appropriate overall research design required to show the causal inference between BWCs and various outcomes. Despite some recent critiques of experimental methods,[145] science simply does not have a better model for causal inference. It is true that implementation of experimental methods "narrow down" the scope of research and they are often quite difficult to carry out, and thus alternative research methods are necessarily, by definition, weaker designs for showing a causal effect. [146] Bluntly, when it comes to studies of cause and effect, we have experiments, and then we have everything else. Mixed methods should be ventured, particularly

---

[144] *See, e.g.*, NAT'L INST. OF JUST., *supra* note 91.

[145] Greene, *supra* note 46; Robert J. Sampson, *Gold Standard Myths: Observations on the Experimental Turn in Quantitative Criminology*, 26 J. QUANTITATIVE CRIMINOLOGY 489 (2010).

[146] Lawrence W. Sherman, *An Introduction to Experimental Criminology*, *in* HANDBOOK OF QUANTITATIVE CRIMINOLOGY 399–436 (Alex Piquero & David Weisburd eds., 2010).

survey methodologies that can capture perceptions and decisionmaking processes. However, the ideal scientific method we have for singling out a cause of an effect is still by way of random assignment under controlled conditions. Everything else is a compromise. We hope that empirical jurists as well as social scientists become more aware of this important distinction and seek to implement RCTs more frequently.

With this in mind, answering any question about the effect of BWCs on *any* outcome will be particularly challenging without an RCT methodology, as non-spurious relationships between independent and dependent variables are difficult to attain. Without proper comparison groups under controlled conditions, the BWCs' treatment effect is easily masked and susceptible to rival explanations. Only true experiments can comfortably assume that baseline comparability between the intervention arm of the study (whatever the intervention is) and the comparison arm, has been achieved—which is the key scientific framework for observing the causal estimate of the intervention.[147] The multiple comparisons in the form of several police districts in the present study strengthen the internal validity of the present study, yet future BWCs studies should be cognizant that the most credible findings will come from multiple or multisite trials, ideally utilizing cluster randomized controlled trials. Otherwise, it will be challenging to adequately evaluate the effect of BWCs deployment, and especially whether in fact they increase desired outcomes, relative to their cost. Failing that, our knowledge on these fast-entering devices will be handicapped.

CONCLUSION

The Denver Police Department has shown that deploying BWCs in one police district caused a significant 35% lower odds for citizens' complaints against the police use of force, but 14% greater odds for a complaint against misconduct, compared to other Denver districts that did not deploy BWCs. The analyses further suggest no discernable effect on use of force in the aggregate compared to control conditions but suggests increases against some districts, which are contextualized as enhanced transparency and accountability as a result of deploying BWCs. Finally, the odds for arrest were 18% lower than the odds under control conditions, suggesting that officers become "cautious" about arresting suspects when BWCs are deployed. Still, methodological challenges of the present study clearly suggest that more research on these outcomes is needed, using

[147] SHADISH ET AL., *supra* note 45.

randomized controlled trials.